Space Weather Forecast

Issued on Friday, 28 June 2024 at 13:24 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Moderate-class flares throughout. G1-G2 Minor-Moderate Storm intervals likely days 1-2 (28-29 Jun) due to recent CME arrival.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low with occasional low level Common-class flares. There are currently eleven regions on the disc, with the previously elongated and complex AR3723 region now reanalysed as two separate regions and subsequently re-classified, with the new AR3730 region constituting the previous leading portion of that group. AR3729 is now the most complex single region, located in the southeast quadrant. All remaining sunspots on the disc are showing only very slow evolution and appear to be stable.

A recent CME (Coronal Mass Ejection) was observed at 28/0905 UTC arriving at L1, which is most likely the arrival of a CME which left the Sun on the 25 June, which was associated with a filament eruption (arc of plasma) off the southwest quadrant.

No other Earth-directed CMEs have been observed in imagery in the past 24 hours.

Solar Wind / Geomagnetic Activity: Solar wind speeds were at background, between 320-350 km/s, until the arrival of a CME (probably associated with the CME which left the Sun on 25 June) with speeds increasing to slightly elevated levels, currently above 450km/s.
The Interplanetary Magnetic Field, Bt, was persistently moderate, increasing to strong, due to the arrival of aforementioned CME. The all-important north-south component (Bz), was persistently negative (southward) orientated and mostly weak to moderate throughout, before increasing to strong, due to the CME arrival. Geomagnetic activity was initially Quiet (Kp 2), but increased to Unsettled to Active (Kp3-4), with a G1/Minor storm interval observed at 28/0900-1200 UTC following the arrival of the CME.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) has remained at background levels with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity expected with a chance of isolated Moderate flares.

Solar Wind / Geomagnetic Activity: A CME which left the Sun on 23 June may have given a weak enhancement overnight. A further CME, which left the Sun on the 25 June, is probably the likely candidate for the recent arrival at Earth, which is slightly earlier than anticipated. Solar winds are expected to be slightly elevated due to the recent CME arrival, just above 450km/s. Solar winds should gradually reduce to background levels during day 2 (29 June) and are expected to remain so throughout the remainder of the period, with no coronal holes on disc, therefore no fast wind enhancements are expected. A CME which left the Sun on 27 June may give a slight chance of a glancing blow on day 4 (01 June) but this is low confidence.

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Geomagnetic activity is expected to be Unsettled to Active (Kp3-4) with a Chance of G1-G2/Minor-Moderate Storm interval, following the recent CME arrival, day 1 (28 June), before gradually waning day 2 (29 June). Becoming mostly Quiet to Unsettled day 3 (30 June), with a chance of Active (Kp 4) and a slight chance of G1/Minor Storm interval by day 4 (01 July) due to a possible glancing blow from a CME, which left the Sun on 27 June.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to remain at background levels, but with a very slight chance of exceeding the S1/Minor Storm threshold should any notable flares occur from the numerous sunspots that currently occupy the visible disc.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	70	50	20	10
Strong	G3	No	10	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	40	40	40	40
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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